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A Skylab Program for the International Hydrological Decade (IHD)

Quarterly Report for Period September 1973 - November 1973

EREP Investigation 427M
NASA Contract NAS9-13275

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Quarterly Report for Period September 1973 - November 1973

This report describes progress during the third quarter (September - November 1973) of Contract NAS9-13275, "A Skylab Program for the International Hydrological Decade (IHD)", EREP No. 427. This cooperative international effort is being directed by Mr. F. C. Polcyn, under the general program coordination of Mr. R. R. Legault of the Environmental Research Institute of Michigan. Co-investigators include researchers at the University of Guelph and the Ontario Ministry of the Environment.

ACTIVITY

During this reporting period ground truth, supporting aircraft, and Skylab data were collected from the Lake Ontario test site. After generally adverse weather conditions had caused postponement of data collection on two previous occasions, Skylab obtained coverage of the northern portion of the Lake Ontario Basin on September 9. Supporting ERIM C-47 aircraft data were obtained from local test sites on September 10 and 11. Ground truth teams from ERIM and the University of Guelph were active during the period September 9-14.

SKYLAB DATA

Earlier plans to obtain EREP data from the Lake Ontario Basin during SL2 and most of SL3 were aborted owing to generally poor weather conditions at the times of Skylab passes. The last opportunity for collecting EREP data for this project occurred on Pass 29, Track 1, of SL3 (9 September 1973). Fortunately, even though the mission on this date had been canceled due to forecasts of overcast conditions, the astronauts activated the Skylab sensors when the weather cleared shortly before the pass over Lake Ontario. Indications are that excellent data was obtained from most of the primary test sites within the Basin. Figure 1 shows the coverage path of S190A Multispectral Camera superimposed on an ERTS mosaic of the Basin. The Basin was clear over the western (Toronto) and central portion of the path and became 40% cloud covered only on the extreme eastern portion of the track. The S190B terrain mapping camera, containing high-resolution panchromatic film, obtained excellent coverage of the northern Lake Ontario shoreline between Oshawa and the St. Lawrence River. The nature and quality of the S192 multispectral scanner data is as yet unknown.

AIRCRAFT DATA

Original plans called for the collection of aircraft photographic and multispectral data simultaneously or nearly simultaneously with the Skylab data collection. Owing to NASA cancellation of the Skylab mission,

the aircraft mission was also canceled. When it was learned that Skylab data actually had been collected from Lake Ontario on September 9, ERIM-C47 aircraft facility was quickly activated. Aircraft data were collected from ten flightlines over selected representative watersheds of the Lake Ontario Basin on the afternoon of September 10. Additional thermal scanner data was collected from the University of Guelph test site at dawn on September 11. The ERIM-C47 aircraft had returned to Ann Arbor by 11 AM of that same day.

Weather conditions remained good during the period of aircraft data collection -- with the exception of some low cloud cover during the dawn mission. The low cloud cover did not seriously affect the quality of the thermal data collected at dawn and all of the aircraft data appears to be of excellent quality. Local test sites for which aircraft data were obtained include 1) No. 6 Highway (Guelph), 2) Oakville Representative Basin, 3) Soper Creek Sub-basin (Bowmanville), 4) Lower Wilmot Creek Basin (Newcastle), and 5) Lower Moria River Basin (Belleville). Although not obtained simultaneously with the Skylab data, these aircraft data are expected to be entirely suitable for this investigation. Twelve channels of multispectral scanner data and color and color IR photographic data in 70 mm format were obtained.

GROUND TRUTH COLLECTION

Ground observations, originally intended to be near-simultaneous with the Skylab overpass, were delayed until the day after the Skylab pass, but some were simultaneous with the aircraft coverage. Research teams from ERIM and the University of Guelph made radiation measurements, collected soil samples, and recorded terrain conditions at various points throughout the northern and western Lake Ontario Basin. Also meteorological data were obtained from ground stations during this period.

FUTURE PLANS

Having obtained a good Skylab data set for pursuing this hydrologic study, the next step requires early playback, reproduction, and dissemination of these data by NASA. In particular, the S192 multispectral scanner data is considered to be most important for the quantitative analysis of terrain elements effecting the terrestrial water balance of Lake Ontario. It is hoped that Skylab photographic and multispectral scanner data will be available for analysis during the next reporting period.

SPECIAL PROBLEMS

None

SIGNIFICANT RESULTS

None

PUBLICATIONS

None

Respectfully submitted,

Fabian C. Polcyn
Principal Investigator

Approved by:

Richard R. Legault
Director Infrared and Optics
Division

FCP:RRL:njm

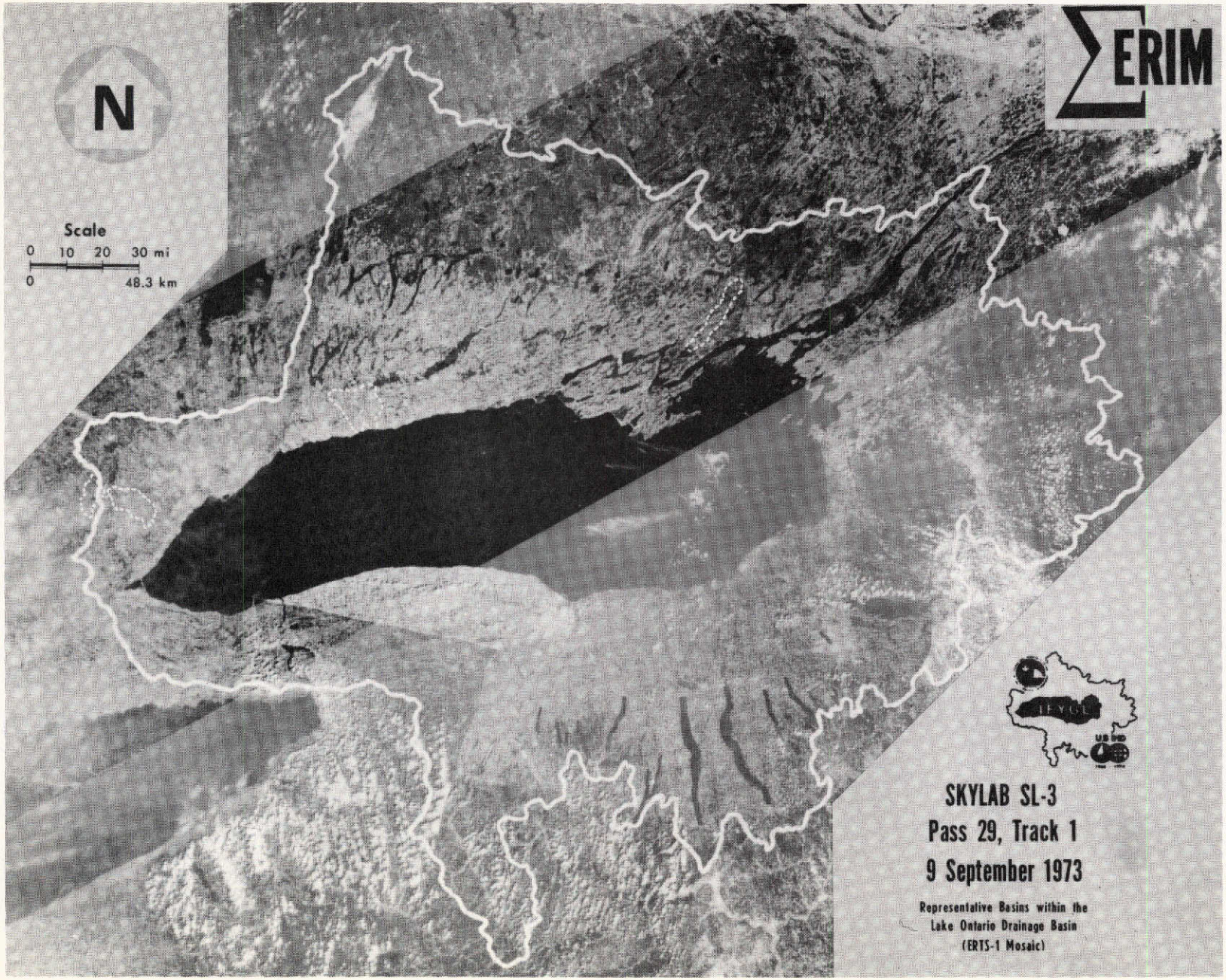
N
Scale
0 10 20 30 mi
0 48.3 km
ERIM
SKYLAB SL-3
Pass 29, Track 1
9 September 1973
Representative Basins within the
Lake Ontario Drainage Basin
(ERTS-1 Mosaic)

FIGURE 1